

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims

1. (Previously Presented) A method of despreading data in a RAKE receiver by selecting delays, comprising the steps of:

searching a plurality of multi-paths to select a set of multi-path delays associated with the highest signal to interference ratios (SIRs) and/or power values;

averaging the respective SIR values and/or power values for the multi-path delays over a time interval;

selecting those multi-path delays from the set of multi-path delays and a previous set of multi-path delays that have SIR values and/or power values greater than a threshold value to generate a monitored set of multi-path delays;

filtering the SIR values and/or power values associated with the monitored set of multi-path delays;

eliminating at least one multi-path delay from the monitored set of multi-path delays as being correlated with another multi-path delay of the monitored set of multi-path delays to generate an output set of multi-path delays; and

providing the output set of multi-path delays to a RAKE receiver.

2. (Original) The method of claim 1, wherein the searching, averaging, and multiplying are performed for a plurality of different cells.

3. (Original) The method of claim 1, wherein selecting those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the threshold value comprises:

selecting those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than

the threshold value such that the selected multi-path delays are associated with a plurality of cells.

4. (Original) The method of claim 1, wherein the threshold value is a first threshold value, and wherein selecting those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the first threshold value such that the selected multi-path delays are associated with the plurality of cells comprises:

replacing a multi-path delay associated with a first cell that has a smallest SIR value and/or power value associated therewith with a multi-path delay associated with a second cell that has an SIR value and/or power value greater than a second threshold value.

5. (Original) The method of claim 1, further comprising:
expanding the monitored set of multi-path delays by adding multi-path delays to the monitored set of multi-path delays that are within a half chip of existing ones of the monitored set of multi-path delays.

6. (Original) The method of claim 5, further comprising:
initializing the SIR values and/or power values for those multi-path delays added to the monitored set of multi-path delays while expanding based on SIR values and/or power values associated with the previous set of multi-path delays.

7. (Original) The method of claim 5, further comprising:
initializing the SIR values and/or power values for those multi-path delays added to the monitored set of multi-path delays while expanding by using a first scaling factor for respective ones of those added multi-path delays that have both left and right neighbor multi-path delays and by using a second scaling factor for respective ones of those added multi-path delays that have only a left or right neighbor multi-path delay.

8. (Original) The method of claim 5, further comprising:

initializing the SIR values and/or power values for those multi-path delays added to the monitored set of multi-path delays while expanding by using a first scaling factor for respective ones of those added multi-path delays that have both left and right neighbor multi-path delays and are within a quarter chip of an existing one of the multi-path delays, using a second scaling factor for respective ones of those added multi-path delays that have only a left or right neighbor multi-path delay and are within a quarter chip of an existing one of the multi-path delays, using a third scaling factor for respective ones of those added multi-path delays that have both left and right neighbor multi-path delays and are between a quarter chip and a half chip away from an existing one of the multi-path delays, and using a fourth scaling factor for respective ones of those added multi-path delays that have only a left or right neighbor multi-path delay and are between a quarter chip and a half chip away from an existing one of the multi-path delays.

9. (Original) The method of claim 1, wherein eliminating the at least one multi-path delay from the monitored set of multi-path delays comprises:

reducing SIR values and/or power values associated with selected ones of the monitored set of multi-path delays based on their correlation with other ones of the monitored set of multi-path delays; and

eliminating those multi-path delays from the monitored set of multi-path delays that have SIR values and/or power values less than the threshold value.

10. (Original) The method of claim 1, wherein the monitored set of multi-path delays is a first monitored set of multi-path delays, the threshold value is a first threshold value, the output set of multi-path delays is a first output set of multi-path delays, and wherein the method further comprises:

selecting those multi-path delays from the output set of multi-path delays that have SIR values and/or power values greater than the first threshold value to generate a second monitored set of multi-path delays;

expanding the second monitored set of multi-path delays by adding multi-path delays to the second monitored set of multi-path delays that are within a half chip of existing ones of the second monitored set of multi-path delays;

filtering the SIR values and/or power values associated with the second monitored set of multi-path delays;

selecting those multi-path delays from the second monitored set of multi-path delays that have SIR values and/or power values greater than a second threshold value to generate a third monitored set of multi-path delays;

eliminating at least one multi-path delay from the third monitored set of multi-path delays as being correlated with another multi-path delay of the third monitored set of multi-path delays to generate a fourth monitored set of multi-path delays;

selecting those multi-path delays from the fourth monitored set of multi-path delays that have SIR values greater than the second threshold value to generate an output set of multi-path delays; and

providing the second output set of multi-path delays to a RAKE receiver.

11. (Original) The method of claim 1, further comprising:

multiplying the averaged SIR values and/or power values by a scaling factor so as to reduce the averaged SIR values and/or power values before selecting those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the threshold value to generate the monitored set of multi-path delays.

12. (Original) The method of claim 1, wherein selecting those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the threshold value to generate the monitored set of multi-path delays comprises:

determining if the set of multi-path delays and the previous set of multi-path delays includes any common multi-path delays; and

associating with respective ones of the common multi-path delays a maximum SIR value and/or power value of the SIR value and/or power value associated with

respective ones of the common multi-path delays in the set of multi-path delays and the SIR value and/or power value associated with respective ones of the common multi-path delays in the previous set of multi-path delays.

13. (Previously Presented) A system of despreading data in a RAKE receiver by selecting delays, comprising:

means for searching a plurality of multi-paths to select a set of multi-path delays associated with the highest signal to interference ratios (SIRs) and/or power values;

means for averaging the respective SIR values and/or power values for the multi-path delays over a time interval;

means for selecting those multi-path delays from the set of multi-path delays and a previous set of multi-path delays that have SIR values and/or power values greater than a threshold value to generate a monitored set of multi-path delays;

means for filtering the SIR values and/or power values associated with the monitored set of multi-path delays;

means for eliminating at least one multi-path delay from the monitored set of multi-path delays as being correlated with another multi-path delay of the monitored set of multi-path delays to generate an output set of multi-path delays; and

means for providing the output set of multi-path delays to a RAKE receiver.

14. (Original) The system of claim 13, wherein the means for selecting those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the threshold value comprises:

means for selecting those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the threshold value such that the selected multi-path delays are associated with a plurality of cells.

15. (Original) The system of claim 13, wherein the threshold value is a first threshold value, and wherein the means for selecting those multi-path delays from the

set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the first threshold value such that the selected multi-path delays are associated with the plurality of cells comprises:

means for replacing a multi-path delay associated with a first cell that has a smallest SIR value and/or power value associated therewith with a multi-path delay associated with a second cell that has an SIR value and/or power value greater than a second threshold value.

16. (Original) The system of claim 13, further comprising:

means for expanding the monitored set of multi-path delays by adding multi-path delays to the monitored set of multi-path delays that are within a half chip of existing ones of the monitored set of multi-path delays.

17. (Original) The system of claim 16, further comprising:

means for initializing the SIR values and/or power values for those multi-path delays added to the monitored set of multi-path delays while expanding based on SIR values and/or power values associated with the previous set of multi-path delays.

18. (Original) The system of claim 16, further comprising:

means for initializing the SIR values and/or power values for those multi-path delays added to the monitored set of multi-path delays while expanding by using a first scaling factor for respective ones of those added multi-path delays that have both left and right neighbor multi-path delays and by using a second scaling factor for respective ones of those added multi-path delays that have only a left or right neighbor multi-path delay.

19. (Original) The system of claim 16, further comprising:

means for initializing the SIR values and/or power values for those multi-path delays added to the monitored set of multi-path delays while expanding by using a first scaling factor for respective ones of those added multi-path delays that have both left and right neighbor multi-path delays and are within a quarter chip of an existing one of

the multi-path delays, using a second scaling factor for respective ones of those added multi-path delays that have only a left or right neighbor multi-path delay and are within a quarter chip of an existing one of the multi-path delays, using a third scaling factor for respective ones of those added multi-path delays that have both left and right neighbor multi-path delays and are between a quarter chip and a half chip away from an existing one of the multi-path delays, and using a fourth scaling factor for respective ones of those added multi-path delays that have only a left or right neighbor multi-path delay and are between a quarter chip and a half chip away from an existing one of the multi-path delays.

20. (Original) The system of claim 13, wherein the means for eliminating the at least one multi-path delay from the monitored set of multi-path delays comprises:

means for reducing SIR values and/or power values associated with selected ones of the monitored set of multi-path delays based on their correlation with other ones of the monitored set of multi-path delays; and

means for eliminating those multi-path delays from the monitored set of multi-path delays that have SIR values and/or power values less than the threshold value.

21. (Original) The system of claim 13, wherein the monitored set of multi-path delays is a first monitored set of multi-path delays, the threshold value is a first threshold value, the output set of multi-path delays is a first output set of multi-path delays, and wherein the system further comprises:

means for selecting those multi-path delays from the output set of multi-path delays that have SIR values and/or power values greater than the first threshold value to generate a second monitored set of multi-path delays;

means for expanding the second monitored set of multi-path delays by adding multi-path delays to the second monitored set of multi-path delays that are within a half chip of existing ones of the second monitored set of multi-path delays;

means for filtering the SIR values and/or power values associated with the second monitored set of multi-path delays;

means for selecting those multi-path delays from the second monitored set of multi-path delays that have SIR values and/or power values greater than a second threshold value to generate a third monitored set of multi-path delays;

means for eliminating at least one multi-path delay from the third monitored set of multi-path delays as being correlated with another multi-path delay of the third monitored set of multi-path delays to generate a fourth monitored set of multi-path delays;

means for selecting those multi-path delays from the fourth monitored set of multi-path delays that have SIR values and/or power values greater than the second threshold value to generate an output set of multi-path delays; and

means for providing the second output set of multi-path delays to a RAKE receiver.

22. (Original) The system of claim 13, further comprising:

means for multiplying the averaged SIR values and/or power values by a scaling factor so as to reduce the averaged SIR values and/or power values before selecting those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the threshold value to generate the monitored set of multi-path delays.

23. (Original) The system of claim 13, wherein the means for selecting those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the threshold value to generate the monitored set of multi-path delays comprises:

means for determining if the set of multi-path delays and the previous set of multi-path delays includes any common multi-path delays; and

means for associating with respective ones of the common multi-path delays a maximum SIR value and/or power value of the SIR value and/or power value associated with respective ones of the common multi-path delays in the set of multi-path delays and the SIR value and/or power value associated with respective ones of the common multi-path delays in the previous set of multi-path delays.

24. (Previously Presented) A computer program product for despreading data in a RAKE receiver by selecting delays, comprising:

a computer readable storage medium having computer readable program code embodied therein, the computer readable program code comprising:

computer readable program code configured to search a plurality of multi-paths to select a set of multi-path delays associated with the highest signal to interference ratios (SIRs) and/or power values;

computer readable program code configured to average the respective SIR values and/or power values for the multi-path delays over a time interval;

computer readable program code configured to select those multi-path delays from the set of multi-path delays and a previous set of multi-path delays that have SIR values and/or power values greater than a threshold value to generate a monitored set of multi-path delays;

computer readable program code configured to filter the SIR values and/or power values associated with the monitored set of multi-path delays;

computer readable program code configured to eliminate at least one multi-path delay from the monitored set of multi-path delays as being correlated with another multi-path delay of the monitored set of multi-path delays to generate an output set of multi-path delays; and

computer readable program code configured to provide the output set of multi-path delays to a RAKE receiver.

25. (Original) The computer program product of claim 24, wherein the computer readable program code configured to select those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the threshold value comprises:

computer readable program code configured to select those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the threshold value such that the selected multi-path delays are associated with a plurality of cells.

26. (Original) The computer program product of claim 24, wherein the threshold value is a first threshold value, and wherein the computer readable program code configured to select those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the first threshold value such that the selected multi-path delays are associated with the plurality of cells comprises:

computer readable program code configured to replace a multi-path delay associated with a first cell that has a smallest SIR value and/or power value associated therewith with a multi-path delay associated with a second cell that has an SIR value and/or power value greater than a second threshold value.

27. (Original) The computer program product of claim 24, further comprising:
computer readable program code configured to expand the monitored set of multi-path delays by adding multi-path delays to the monitored set of multi-path delays that are within a half chip of existing ones of the monitored set of multi-path delays.

28. (Original) The computer program product of claim 27, further comprising:
computer readable program code configured to initialize the SIR values and/or power values for those multi-path delays added to the monitored set of multi-path delays while expanding based on SIR values and/or power values associated with the previous set of multi-path delays.

29. (Original) The computer program product of claim 27, further comprising:
computer readable program code configured to initialize the SIR values and/or power values for those multi-path delays added to the monitored set of multi-path delays while expanding by using a first scaling factor for respective ones of those added multi-path delays that have both left and right neighbor multi-path delays and by using a second scaling factor for respective ones of those added multi-path delays that have only a left or right neighbor multi-path delay.

30. (Original) The computer program product of claim 27, further comprising:

computer readable program code configured to initialize the SIR values and/or power values for those multi-path delays added to the monitored set of multi-path delays while expanding by using a first scaling factor for respective ones of those added multi-path delays that have both left and right neighbor multi-path delays and are within a quarter chip of an existing one of the multi-path delays, using a second scaling factor for respective ones of those added multi-path delays that have only a left or right neighbor multi-path delay and are within a quarter chip of an existing one of the multi-path delays, using a third scaling factor for respective ones of those added multi-path delays that have both left and right neighbor multi-path delays and are between a quarter chip and a half chip away from an existing one of the multi-path delays, and using a fourth scaling factor for respective ones of those added multi-path delays that have only a left or right neighbor multi-path delay and are between a quarter chip and a half chip away from an existing one of the multi-path delays.

31. (Original) The computer program product of claim 24, wherein the computer readable program code configured to eliminate the at least one multi-path delay from the monitored set of multi-path delays comprises:

computer readable program code configured to reduce SIR values and/or power values associated with selected ones of the monitored set of multi-path delays based on their correlation with other ones of the monitored set of multi-path delays; and

computer readable program code configured to eliminate those multi-path delays from the monitored set of multi-path delays that have SIR values and/or power values less than the threshold value.

32. (Original) The computer program product of claim 24, wherein the monitored set of multi-path delays is a first monitored set of multi-path delays, the threshold value is a first threshold value, the output set of multi-path delays is a first output set of multi-path delays, and wherein the system further comprises:

computer readable program code configured to select those multi-path delays from the output set of multi-path delays that have SIR values and/or power values

greater than the first threshold value to generate a second monitored set of multi-path delays;

computer readable program code configured to expand the second monitored set of multi-path delays by adding multi-path delays to the second monitored set of multi-path delays that are within a half chip of existing ones of the second monitored set of multi-path delays;

computer readable program code configured to filter the SIR values and/or power values associated with the second monitored set of multi-path delays;

computer readable program code configured to select those multi-path delays from the second monitored set of multi-path delays that have SIR values and/or power values greater than a second threshold value to generate a third monitored set of multi-path delays;

computer readable program code configured to eliminate at least one multi-path delay from the third monitored set of multi-path delays as being correlated with another multi-path delay of the third monitored set of multi-path delays to generate a fourth monitored set of multi-path delays;

computer readable program code configured to select those multi-path delays from the fourth monitored set of multi-path delays that have SIR values and/or power values greater than the second threshold value to generate an output set of multi-path delays; and

computer readable program code configured to provide the second output set of multi-path delays to a RAKE receiver.

33. (Original) The computer program product of claim 24, further comprising:

computer readable program code configured to multiply the averaged SIR values and/or power values by a scaling factor so as to reduce the averaged SIR values and/or power values before selecting those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the threshold value to generate the monitored set of multi-path delays.

34. (Original) The computer program product of claim 24, wherein the computer readable program code configured to select those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the threshold value to generate the monitored set of multi-path delays comprises:

computer readable program code configured to determine if the set of multi-path delays and the previous set of multi-path delays includes any common multi-path delays; and

computer readable program code configured to associate with respective ones of the common multi-path delays a maximum SIR value and/or power value of the SIR value and/or power value associated with respective ones of the common multi-path delays in the set of multi-path delays and the SIR value and/or power value associated with respective ones of the common multi-path delays in the previous set of multi-path delays.

35. (Original) An electronic device, comprising:

a path searcher module that is configured to search a plurality of multi-paths to select a set of multi-path delays associated with the highest signal to interference ratios (SIRs) and/or power values;

a delay despreading and SIR calculation module that is configured to average the respective SIR values and/or power values for the multi-path delays over a time interval and to multiply the averaged SIR values and/or power values by a scaling factor so as to reduce the averaged SIR values and/or power values;

a delay selection and monitoring module that is configured to select those multi-path delays from the set of multi-path delays and a previous set of multi-path delays that have SIR values and/or power values greater than a threshold value to generate a monitored set of multi-path delays, to filter the SIR values and/or power values associated with the monitored set of multi-path delays;

to eliminate at least one multi-path delay from the monitored set of multi-path delays as being correlated with another multi-path delay of the monitored set of multi-path delays to generate an output set of multi-path delays; and

a RAKE receiver having fingers tuned based on the output set of multi-path delays.